ARIZONA DEPARTMENT OF HEALTH SERVICES

BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

LEVEL I TRAUMA CENTERS

PERFORMANCE IMPROVEMENT MEASURES

ARIZONA STATE TRAUMA REGISTRY 2011

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Report No. 13-3-LI

Purpose:

The purpose of this report is to provide hospitals a baseline level of comparison on their performance in 2011. This report can be used to support Quality Assurance initiatives in their communities.

This report analyzes four trauma related performance measures:

1. Reduce Emergency Department (ED) dwell time at Level IV trauma centers before transfer to Level I trauma centers
2. Reduce transfers after admission
3. Reduce deaths outside of trauma centers
4. Increase trauma billing efficiency

Methodology:

The Arizona State Trauma Registry 2011 (ASTR) and the Hospital Discharge Database 2011 (HDD) were queried for data on the four measures.

1) Patients with an ED disposition of "Transfer to acute care" were filtered. The final transfer destination was an Arizona Level I Center or an acute care facility in Nevada.

The ED Dwell time is the difference between two elements "ED/Hospital Arrival Date/Time" and "ED Exit Date/Time", or if unable, "Length of Stay".[1] **This measure used transfer data from Level IV Trauma Centers for your facility.**

2) The transfer after admission was calculated by first filtering patients who were admitted and then had a final discharge disposition as transfer. The final hospital discharge destination was an Arizona Level I trauma centers or a Nevada acute care facility.[1] **This measure used transfer data from Level IV Trauma Centers for your facility.**

3) Patients that die in a Non-Trauma Centers was found by querying trauma related injuries in the HDD. Deaths were limited to hospitals that were not designated trauma centers in 2011.[2]

4) The trauma billing efficiency score was calculated by comparing patients who had a trauma team activation and arrived by ambulance in ASTR. A hospital that meets this criteria would qualify for 068X revenue under the HDD. A billing efficiency score was calculated by comparing the numbers reported in HDD and ASTR.[1,2]

[1] Source: Arizona State Trauma Registry

[2] Source: Hospital Discharge Database

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
Report No. 13-3-L1

Performance Measure 1: Reduce ED Dwell Time

Table 1: ED dwell time by ISS by categorical classification

1st Performance Measure: ED dwell time at Level IV TC before transfer to Level I TC	Overall		By Injury Severity Score					
			*Missing/NA/ND		ISS <=15		ISS >15	
	N	%	N	%	N	%	N	%
<2 hours	185	25.23%	20	44.44%	137	24.64%	28	21.21%
>=2 hours	548	74.76%	25	55.55%	419	75.35%	104	78.78%
Total patients transferred	733	100.00%	45	100.00%	556	100.00%	132	100.00%

Table 2: Time distribution of ED dwell time

Median ED dwell time (hrs)	Count	25%	Median	75%	Max
Overall	688	2	3.1	4	28
By Injury Severity Score					
ISS ≤15	556	2	3.2	4	28
ISS >15	132	2	2.9	4	16

Traumatic injuries require that a system rapidly assess and intervene to prevent morbidity and mortality. One method for assessing performance on this measure is to evaluate the length of time patients are held in a level IV trauma center before they are transferred to a level I trauma center.

Most experts agree that patients whose injuries require a transport to a level I trauma center should be transferred within two hours of arrival at the level IV trauma center. **This measure exclusively analyzed 'transfer data' from Level IV Trauma Centers to a Level I Trauma Center.**

While there are various factors that contribute to a transfer, a sending facility can develop interventions and best practices that can reduce the ED dwell time.

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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Performance Measure 2: Reduce transfers after admission

Table 3: Transfers after admission by length of stay

2nd Performance Measure: Transfer to Level I TC after admission at Level IV TC	N	%
Total patients	7	100.00%
Los (Days)	2	28.57%
<1 day		
1	4	57.14%
6	1	14.28%

The goal of any trauma system is to get the right patient to the right place in the right amount of time.

Depending upon the severity of injury, some patients should be evaluated and admitted at level a IV trauma centers. These facilities must have the resources and personnel necessary to address the needs of that patient.

This measure used 'patient transfer' data from Level IV Trauma Centers for a Level I facility.

Patients that are outside of a level IV trauma center's capabilities should be stabilized by the staff while simultaneously arranging for transportation to a proper level of care. Patients that present to a level IV trauma center should be adequately screened to ensure that the hospital is able to provide the right level of care.

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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Performance Measure 3: Reduce deaths outside of trauma center

The Arizona State Trauma Advisory Board adopted the trauma triage guidelines developed by the Centers for Disease Control and Prevention. This evidence based tool recognizes seriously injured individuals who should receive treatment at a designated trauma center.

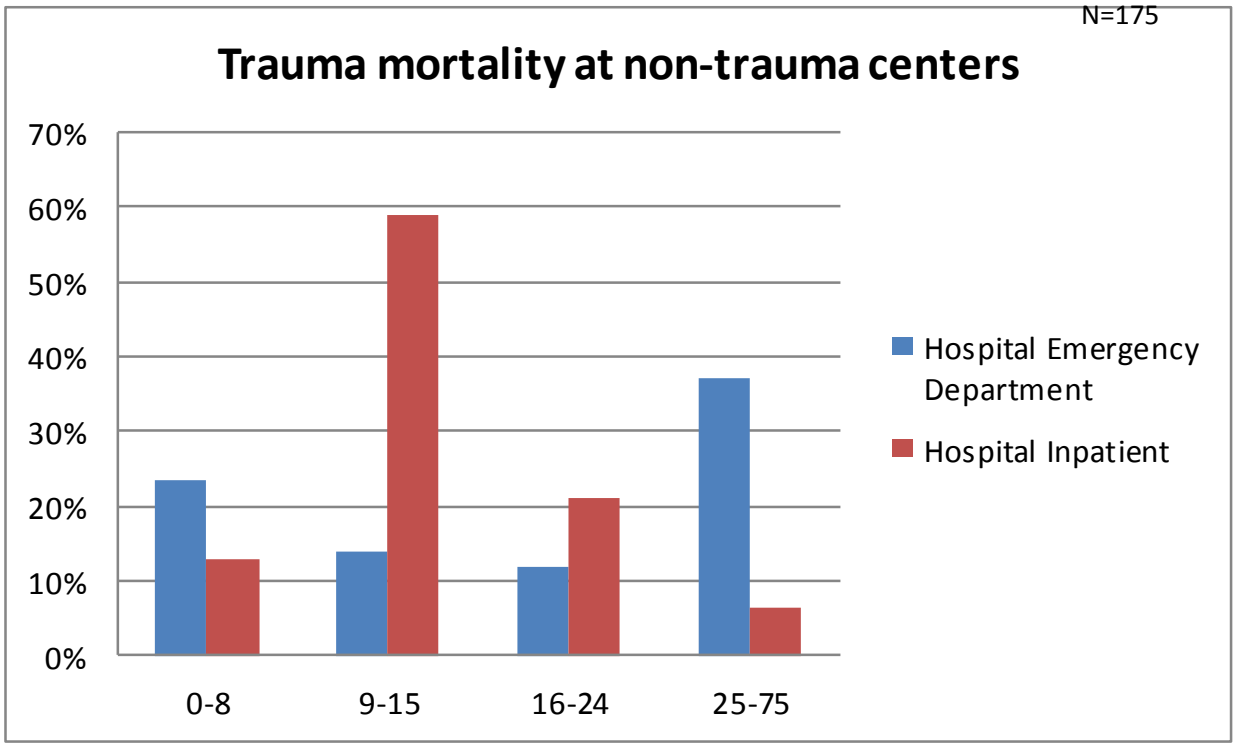

Table 4: Mortality at non-trauma centers by ISS

Mortality at non-trauma centers	Overall		Hospital Emergency Department		Hospital Inpatient	
	N	%	N	%	N	%
Total patients died	175	100.00%	51	29.14%	124	70.85%
By Injury Severity Score						
*Missing/NA/ND	8	4.57%	7	13.72%	1	0.80%
1-8	28	16.00%	12	23.52%	16	12.90%
9-15	80	45.71%	7	13.72%	73	58.87%
16-24	32	18.28%	6	11.76%	26	20.96%
25-75	27	15.42%	19	37.25%	8	6.45%

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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Table 5: Age demographics of deaths outside trauma centers

	N	%
Total Died	175	100.00%
<5	3	1.71%
9-14	1	0.57%
15-17	1	0.57%
18-24	3	1.71%
25-44	11	6.28%
45-64	30	17.14%
65+	126	72.00%

Table 6: Injury demographics of deaths outside trauma centers

	N	%
Traumatic Brain Injury	57	32.57%
Other head, face, neck	8	4.57%
Vertebral column injury	6	3.42%
Torso	24	13.71%
Upper extremity	1	0.57%
Lower extremity	67	38.28%
Other & unspecified	7	4.00%
System wide & late effects	5	2.85%

Table 7: Admission demographics of deaths outside trauma centers

	N	PctN
Source of admission		
Non-Health Care Facility Point of Origin	161	92.00%
Clinic or Physician's Office	1	0.57%
Transfer from a Hospital (different facility)	7	4.00%
Transfer from a Skilled Nursing Facility	4	2.28%
Transfer from another Health Care Facility	1	0.57%
Transfer from Hospice	1	0.57%

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
Report No. 13-3-L1

Performance Measure 4: Increase billing efficiency

Table 7: Billing efficiency for level I trauma centers

4th Performance Measure: Billing efficiency	ASTR - Trauma Team Activation and Arrived by Ambulance	HDD # 068X Selected	Trauma Billing Efficiency Score
Aggregate Level I	18,104	15,579	86.05%

Trauma team activations are vital resource that ensure a coordinated and capable response to injured patients presenting to a trauma center. This resource is an essential component of a trauma center and are costly to a hospital.

Financial viability ensures the sustainability of dedicated trauma care in rural communities. A commitment to clinical excellence must coincide with efficient billing.

Data from two registries (HDD and ASTR) were used to develop the following tool to describe how the designated trauma centers are performing related to trauma billing efficiency.

Trauma Billing Efficiency Score= HDD # 068X Selected / ASTR - Trauma Team Activation:

A higher value denotes a better trauma billing efficiency for the state.